We have revolutionized the sulfuric acid industry through the application of our innovative process and equipment technologies, enabling more than 800 plants achieve higher capacities and availability, lower costs of operation, reduced emissions and greater safety.
Your Plant, Our Solutions & Technology

Sustaining our world for generations to come through technological and environmental innovation, we deliver Comprimo® sulfur and Chemetics® sulfuric acid solutions to meet your business objectives with a focus on site reliability, plant economics and workforce development.
Where We Are Today

Vancouver
Calgary
Pickering
Casablanca*
The Hague
Santiago
Moscow
Beijing*
Shanghai
Bangkok*
Taipei*
Beijing*
Johannesburg*
Kuala Lumpur*
Jakarta*
São Paulo*
Sao Paulo*
Johannesburg*
Sydney*

Comprimo
Chemetics
Worley
* Chemetics' representatives
Sulfur & Sulfuric Acid Services

- Research and Development (R&D)
- Consulting, Studies, Debottlenecking
- Engineering, Technology Licensing, Procurement
- Proprietary Equipment Design and Fabrication
- Project/Program and Construction Management
- Construction, Technical Services, Commissioning
- Operator Training, Maintenance, Turnarounds, Retrofits, Revamps
State-of the Art Fabrication Shop

- Custom design and fabrication in Pickering, Canada
- **Office space:** 1,740 m²,
- **Machine shop:** 1,700 m²
- **Assembly bays:** two bays, 2,730 m² each
- **Crane capacity:** seven cranes, each with a span of 22 m
- **Lift capacity:** 100 MT
- **Global shipping capacity:** 5 m dia. x 25 m long x 165 MT
Technology Centre

- Research and product development lab in Vancouver, Canada
- Sulfuric Acid pilot plant
- Technical services and paid studies
- Quality control
- Commissioning and site support
Our People

A few of the languages we speak:

- Arabic
- Bahasa
- Bemba
- Bulgarian
- Cantonese
- Cebuano
- Czech
- Dutch
- English
- Farsi
- Finnish
- French
- German
- Hindi
- Italian
- Mandarin
- Polish
- Panjabi
- Portuguese
- Romanian
- Russian
- Slovak
- Spanish
- Swedish
- Tagalog
- Turkish
- Ukrainian
Meeting the challenges energy producers are faced with worldwide, we minimize emissions from sulfur handling units—hydrogen sulfide (H₂S), sulfur dioxide (SO₂), sulfur trioxide (SO₃), carbon disulfide (CS₂) and carbonyl sulfide (COS).
Chemetics Sulfuric Acid Solutions

- Sulfuric Acid Plants – metallurgical, sulfur burning, regeneration
- Sulfuric Acid/Nitric Acid (SAC/NAC) Concentration Plants
- Radial Flow Gas-Gas Heat Exchangers
- CORE™ (isothermal converter)
- Acid Towers (SARAMET® and brick lined)
- ISO-FLOW™ Trough Acid Distributors with SWIFT-LOCK™
- CES-ALPHA™, CES-DSW™, CES-BFW™ (heat recovery)
- Radial Flow Stainless Steel Converter
- Anodically Protected Acid Coolers with ANOTROL®
- SARAMET® Acid Coolers
- SARAMET® 23, 25, 35, HT, HT+, CIRAMET® Alloys
- Tail Gas Scrubbers – peroxide, lime, caustic, regenerative
- Sulfur Melting and Filtration Plants
- Gas Cleaning Plants (GCP)
- Wet Gas Condensers
- Effluent Treatment Plants (ETP)
Technical Services:

As Sulfuric Acid plants age, and producers needs change, vendors can provide valuable technical services to guide producers through these challenges.

These services can guide producers in maintaining/replacing end of life equipment and upgrading plant capabilities to meet any new environmental or operational cost landscapes.

Chemetics has a broad range of services available that draw on our experience in implementing Sulfuric Acid plants and retrofits. These services are integral to the Chemetics “Cycle for Success” (Figure 1). This cycle ensures perpetual improvement and excellence by linking the experience/knowledge gained in any single step to the subsequent step, and so on.
Figure 1

Chemetics Cycle for Success

1. R&D
2. Multi-Discipline Engineering/Design
3. Project Engineering & Management
4. Proprietary Equipment Design & Fabrication
5. Installation Services
6. Commissioning Services
7. Follow-up Support
8. Turn-around & Inspection Services
Chemetics Technical Services

Chemetics offers a full complement of Technical Services fall under two main categories:

• **Process Engineering Technical Services**

• **Site Technical Services**
Process Engineering Technical Services always start with a question that needs to be answered. The type of question leads to what type of service is required to get the answer with the correct information for what is needed next.
What is best practice? Why are we having problems?

A **Process Audit** can help

- Identify shortfalls in operations and maintenance practices that could help the reliable operation of the plant.
- Evaluate current operation versus design capabilities to identify process shortcomings and opportunities for improvement.
- Identify the causes of chronic failures, leading to permanent fixes. This evaluation is especially useful after a plant inspection.
What is possible? What are the Options?

Leads to a **Scoping Study**.

- A scoping study is short duration, high level study that looks at many different technologies and options.
- This level is intended to identify the possible types of solutions, and what the high-level impacts are.
- From this wide list one or a few options stand out and are developed further.
How do we achieve this?

A Debottlenecking Study

• This can be approached from the standpoint of starting with a new design capability and finding out how to fit the existing plant to this capability.

• Or by evaluating each piece of equipment for how much further it could be pushed.

• Indicative pricing can be included to narrow down the options or establish project budgets.
Process Engineering Technical Services

Will this react the way we think it does?

A Lab Study

• Useful for certain processes where the composition of the material to be processed is complex and subtle differences can have a significant impact on the process.

• This is particularly true for processing waste streams such as spent acid, or effluent treatment plants.

• The actual process conditions can be replicated in our lab for confirmation of process performance before investing in the plant.
How much will it cost? How long will it take?

A Feasibility Study

- Adds the economic and schedule factors to a debottlenecking study.

- The scope and price of a feasibility study is tailored to the question: “What information do you need to make the next decision?”
A phased approach to plant improvement may start with:

- **Plant Inspection** and **Process Audit** identifying problem areas or opportunities.
- A **Scoping Study** is next to identify a broad range of solutions, some of which may stand out as clearly more desirable.
- A **Debottlenecking Study** would then be used to map out what specifically needs to be done to achieve the desired end state.
- A **Lab Analysis** could be done to confirm that the presumed properties of the material will work in the proposed process.
- **Feasibility Study** will tie in the economics of implementing the change to a level required to evaluate the project for final approval.
Having experienced Chemetics professionals who have designed, operated, and maintained acid plants as part of your site technical services team will add value by saving time, capital and help to ensure future consistent operation.
Site Technical Services

Troubleshooting
• Technology experts are available to help systematically identify the root of process and mechanical issues and recommend solutions.

Failure Analysis
• Corrosion and material specialists are available to identify the root cause of equipment failure and recommend corrective actions to prevent the failure from reoccurring.
Site Technical Services

Acid Cooler and Anotrol® Inspections
• Conduct regular inspections on Chemetics acid coolers and test the anodic protection systems.

Turnaround Plant Inspections
• Internal inspection of major equipment to identify issues in sufficient time to plan repair or replacement before failure for improved process safety from reduced operation incidents.
• Prevent reoccurrences with root cause analysis resulting in increased operation up time by preventing unplanned maintenance.
Site Technical Services

Equipment Installation Advisors

• Support your new or replacement equipment installation and ensure that industry best practices are followed, and issues are identified in time to correct them.

• Conduct constructability reviews before project execution to minimize risk.

• Review equipment fabrication shops prior to and during fabrication.
Site Technical Services

Commissioning

• Experienced technical staff can assist in commissioning new projects and plant retrofits.

Hands on Training

• Ensure operations and maintenance staff have the knowledge and skills to ensure safe and reliable plant operation.
Plant Revamp Example

An aging Sulfur Burning Sulfuric acid plant has determined that they have the market for substantially more acid than they are currently capable of producing.

In previous work Chemetics inspection service technicians have been on site to assist with maintenance planning to extend the life of several major process vessels, however some now need replacement in the short term, and many more over the next decade.

The required replacements represent an opportunity to revisit the design of the plant so that the replacement equipment can all be designed with a consistent design basis for increased production capacity.
Plant Revamp Example

An initial scoping study is used to determine the capability of each piece of equipment under a number of potential future capacity scenarios, and the approximate sizing of the required replacement equipment to achieve these scenarios.

High level budget costs are evaluated to narrow down the options. With these results a roadmap for the site revamp is created.
Plant Revamp Example

The roadmap takes the client selected target scenario based on the budget price, the expected life remaining in each piece of equipment to help determine the sequence of implementation, and the client specific project and approval process to map out a set of studies and projects to implement the revamp.
Plant Revamp Example

For an approval process the client requires:

1. The high-level costs from the scoping/debottlenecking study to approve the overall capital plan.

2. A tighter budget based on actual equipment quotes and estimated install costs to put the project in the budget

3. A very tight budget cost based on a single design, quoted equipment, and construction costs for final project approval
Plant Revamp Example

To satisfy the second approval stage, a prefeasibility study is required to select between design options, layout configurations and construction plans to the point that the project can be put in the budget.

For the final approval stage, a detailed feasibility study is conducted.

• Detailed look at the selected option for implementation for the phase.
• Much of the engineering for the equipment itself is completed and the preliminary layout requirements for connecting ducting and piping are considered.
• Quotes are acquired (i.e. equipment, construction) to develop out the definitive project budget.
Plant Revamp Example

• For the project execution itself, due to the high level of detail in the previous phases, detail engineering and procurement can run in parallel.

• For long lead vessels the design is finalized enough that procurement of the materials and contracting of fabricators can begin before final detail engineering of the wrap around portion is completed (such as duct and piping layout, civil, platforms, E&I). This allows substantial schedule savings.

• The project is supported with site construction advisory and commissioning support services along with QA/QC and expediting for fabricators.
Plant Revamp Example

By planning ahead with a reasonable schedule:

• Last minute decisions driven by schedule or misunderstood costs can be avoided.

• Ensure that the appropriate design is implemented with cost control and well managed project risks.
Plant Revamp Example

Scope of Services

• Inspection and Equipment Technical Services / Turnaround Support
• Scoping Study / Process Technical Services
• Debottlenecking Study
• Feasibility Study
• Basic Engineering
• Detail Engineering
• Procurement, QA/QC, Expediting
• Construction Advisory Services
• Commissioning Support
Chemetics can bring a vast array of experience from various operations to the table, thus ensuring the best solutions are available. These technical services are often of nominal cost and can provide extended equipment life, best allocation of capital/maintenance funds, predictable project outcomes.